To:

New York State Department of Transportation

ENGINEERING INSTRUCTION

EI 97-013

Title: **SAFETY SHOULDER RUMBLE STRIPS (SAFE-STRIPS) POLICY AND REVISED INSTALLATION DETAILS**

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Approved:

_____ 6/6/97

T. C. Werner, Director
Transportation Planning, Highway Safety,
and Traffic Engineering Division

6/6/97

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P. J. Clark, Director
Design Division

This Engineering Instruction supersedes EI 95-008. Specifically, it revises the specifications and details, supplements the original engineering guidance, and generally retains (with a few modifications) the ***Policy for the Use of Safety Shoulder Rumble Strips (SAFE-STRIPS)***. As stated in the original Engineering Instruction, SAFE-STRIPS shall be installed as a standard design practice on appropriate State Highways according to the Site Selection Criteria in the policy.

The revised specifications shall be effective with projects let on or after ___. The special specifications will continue to be Main Office inserts. The ***specification revisions*** [which apply to in-lb (English) versions, also] include the following:

- Item 14646.10 M At the Department's discretion, the offset from the traveled way to the MIARD (milled-in audible roadway delineator) may be increased to avoid existing deteriorated areas or joint sealant. (See the Engineering Guidance below.)
- Item 14646.10 M The MIARD milling equipment must be capable of installing a MIARD as close as 0.9 m to an adjacent vertical obstruction. (See Engineering Guidance below.)
- Item 14646.10 M The Contractor should adjust the spacing of MIARDs to fit between lines of cross-hatch pavement markings (such as at gore areas) to minimize damage to them. (See guidance below.)
- Item 14646.10 M On concrete shoulders and HMA overlays on concrete shoulders, where the transverse joints have been sawed and sealed, the spacing of the MIARDs should be adjusted to prevent any damage to the seals or joints. No adjustment is required where reflective cracking through an overlay has not been sawed and sealed.
- Item 14646.10 M For projects in residential or developed areas, or areas with closed drainage systems or curbing, the Contractor is to collect and remove the grindings from the project and dispose of them in an acceptable manner. In other locations, the material shall, at a minimum, be swept off of the shoulder. (See Engineering Guidance below.)
- Item 14646.11 M To improve RIARD (rolled-in audible roadway delineator) performance, the diameter of the pipe used to roll in RIARDs is being increased to 2.5 NPS (2½ in). (Note that

RIARDs are not to be used on SUPERPAVE shoulders.)

- Item 14646.12 M On ESAL-based concrete pavement designs, the FINARD location has been moved to the shoulder pour, since trying to push large impressions in near the edge of a slip-formed slab would not be practical or acceptable.
- Item 14646.13 M FICARD (formed-in corrugated audible roadway delineator) spacing is being adjusted away from transverse joints to permit the joint saw to operate on an even surface. (See guidance below.)
- Item 14646.13 M To promote drainage and reduce problems with the height of squeezed-out concrete, the form or lute used to impress FICARDs should be dragged towards the outside of the shoulder after the impression is made.

The supplements to the ***engineering guidance*** are presented below and will be incorporated into the existing Safe-Strip guidance in Chapter 3 of the Highway Design Manual.

- Rumble strips are not to be used on bridges.

- Rumble strips should not be placed across residential driveway entrances.

- MIARDs should not be used on shoulders where a Type I Optional Flexible Shoulder has been used. Similarly, Type I Optional Flexible Shoulders should not be used in areas that are likely to warrant the use of MIARDs within the anticipated life of the shoulder.

- The designer should inspect the site of the proposed installation to determine several factors relative to SAFE-STRIP installation. One of these is the distance from the traveled way to an obstruction. MIARDs should not be specified where there is not at least 0.9 m of space between the outside edge of the MIARDs and an obstruction.

- In areas where there is deterioration of the shoulder immediately adjacent to the travel lane, or close enough to prevent satisfactory installation of MIARDs at the normal offset, but the remainder of the shoulder is in satisfactory condition to install MIARDs, the minimum offset may be increased as necessary. However, where bicyclists are permitted, milling should only be done if at least .9 m of usable paved shoulder will be left for their use, or, in isolated cases not exceeding 20 m in length, at least .6 m will be left. The offset may also be increased in areas where excessive amounts of joint sealer are present and may interfere with the grinding operation. It should be remembered that the farther the SAFE-STRIP is from the travelled way, the less warning it will provide to fatigued or dozing drivers and the less effective it will be as an accident countermeasure.

- It is desirable to provide SAFE-STRIPs within gore areas. Where the area has cross-hatched pavement markings, the designer should determine whether or not there is sufficient space between the markings to permit milling in MIARDs without damaging the lines. If there is not adequate space, the MIARD spacing should be adjusted to minimize the amount of pavement marking removed in that area.

- In terminal (merging) gore areas, the MIARDs should be carried to the point at which they touch the converging edge-of-traveled-way line.

- Where there are median cross-overs, their deceleration lane widths should be examined to see if there is sufficient width for both a vehicle and the SAFE-STRIP. If there is not, consideration should be given to widening the deceleration lane. Alternatively, the decision of whether or not to include SAFE-STRIPs along the cross-over area should take into account the inconvenience and potential hazard to authorized users of the cross-over compared with the protection that their installation might provide to general motorists.

- Some existing off-ramps may have shorter deceleration lanes than desirable. Where it is judged that some use of the shoulder in the deceleration process is appropriate, consideration should be given to interrupting the line of SAFE-STRIPs prior to where the ramp is actually marked. Such decisions should be made in consultation with the Regional Traffic Engineer.

- The Environmental Analysis Bureau has confirmed that there should not be any environmental problem with sweeping ground asphalt off of the shoulder and onto the adjoining unpaved area. The specifications require the grindings to be picked up in curbed, closed drainage, residential, or developed areas. The designer should ascertain whether there is a need to pick up the grindings at other project locations. If there is a need, a note to that effect should be placed on the appropriate project drawings.

- A survey of other states revealed that only one permits the use of fog seal, and in that instance, they indicated there was no engineering basis for its use. The other states, some of which have been milling in MIARDs for over nine years, say they have found no evidence of deterioration, provided the milling was done on a surface that was initially in reasonably good condition. Based on their experience and mindful of the cost and operational complications, use of fog seal is not endorsed. However, pending evaluation of field tests, use of fog seal will not be precluded, either.

- Some problems have been encountered with achieving full impression of the Rolled-In Audible Roadway Delineators (RIARDs). These appear to be primarily due to the rolling operation lagging too far behind the placing. SUPERPAVE mixes will be stiffer than conventional mixes. Therefore, RIARDs should not be used on SUPERPAVE shoulders.

The complete attached policy, including each provision, should be thoroughly reviewed before designing SAFE-STRIP installations. Section 3.2.5.4 of the Highway Design Manual should also be reviewed.

Any questions or clarifications concerning the attached policy can be directed to John Watson of the Transportation Planning, Highway Safety and Traffic Engineering Division at (518) 457-3537. Questions related to design specifications or construction details should be directed to Terry Hale of the Design Division at (518) 485-7009.